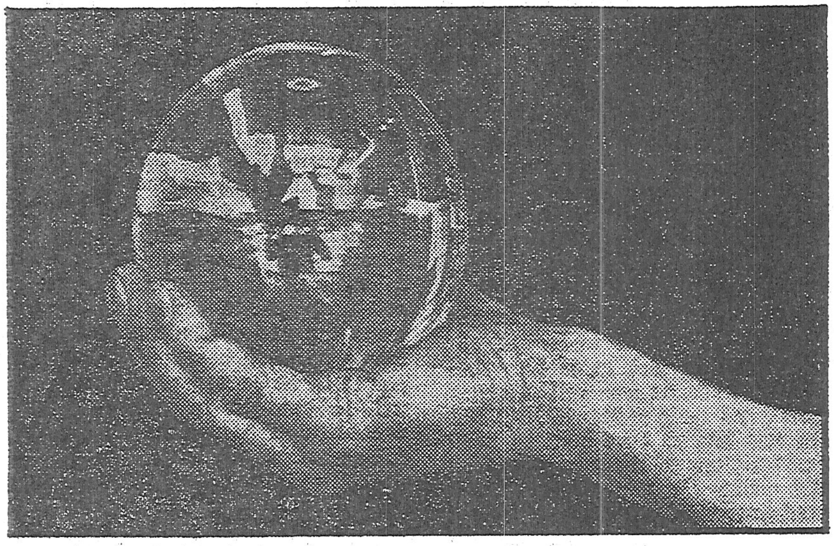
# What for Tomorrow's Lamps?


Zvi Lowenthal

"What we are doing is shifting from the age of oil to another energy age," an oil industry spokesman said the other day. "Historically speaking, transition periods are very interesting but living through them may not be so much fun."

Blackouts, brownouts and fuel shortages, for example—and it may be decades before the United States actually ceases to be so dependent on fossil fuels. Meanwhile, experts are eyeing some long-range alternatives:

GEOTHERMAL ENERGY: Iceland, Italy and New Zealand have been harnessing underground hot water and steam to provide power for years. Now a National Science Foundation panel headed by former Interior Secretary Walter J. Hickel wants the United States to spend $684-million to develop similar projects. The only developed geothermal field in the United States is The Geysers near San Francisco but some experts say 59 million acres of geothermal land in 14 Western states, by the year 2000, could generate electricity equivalent to America's present output.

SOLAR POWER: The potential of the sun as an energy source is tremendous; harnessing it is another matter. One spectacular approach has been suggested by Dr. Peter Glaser of the Arthur D. Little Inc., think-factory. He wants to place a 25-square-mile panel of photo-voltaic cells—devices made of silicon that convert sunlight to electricity—in stationary orbit 22,000 miles in space. The cells would collect the sunlight energy, convert it into an electric current and then beam it back to a giant, 36-square-mile antenna on earth. Dr. Glaser estimates that a $20-billion investment in his project would provide 10 million kilowatts of electricity.

SEA POWER: In early Brooklyn, the Dutch burghers erected dams which were opened to admit the flowing tide and closed at the ebb. The dammed-up water then was slowly released through chutes to turn water mills. For decades residents of Maine and the neighboring Canadian provinces have dreamed of similar but much larger schemes to exploit the great tides of the Bay of Fundy. But study after study has shown that the investment would be too large for the return. In France, however, a tidal power plant is in operation near St. Malo. A more exotic use of ocean power would take advantage of the fact that in the tropics surface seawater never drops below 82 degrees Fahrenheit, while deep currents often are as cold as 35 degrees. By forcing the hot surface water down into the cold deep water and making use of a heat exchanger system, it would be possible to drive turbines to develop electricity. Such a system was tested off Cuba in 1929 but little else has been done since.

NUCLEAR POWER: Twenty-nine commercial nuclear power plants are in operation in the United States but to the scientists these are the Model T Fords of the industry. The experts look to two developments to provide really significant nuclear power supplies.

The first uses the so-called fast-breeder reactor as its basic component. Conventional nuclear plants use as their fuel uranium-235, a relatively scarce variety. The more common uranium-238 is used as a nonfissionable part of the process. In a breeder reactor the splitting of the 235 atoms is accelerated to react with the 238, in the process producing 14 atoms of plutonium for each 10 atoms of fuel used. The importance of the plutonium is that it can be used as a substitute for the 235. But there are hitches: Plutonium is the stuff of which atom bombs are made. And wastes from the breeder can be dangerous to humans for up to 200,000 years.

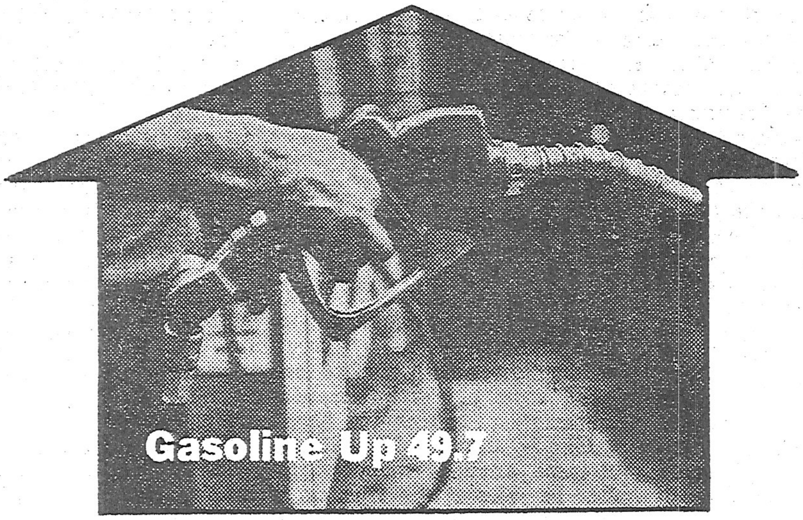
The second area of nuclear research involves taming the power of the hydrogen bomb—thermonuclear (fusion) power. But even the most optimistic scientists think this is decades — perhaps a century—away.

OTHER POWER SOURCES: Coal is the most abundant of the fossil fuels and several projects are seeking to make more efficient use of the enormous deposits in the United States. A principal approach is to use steam to react with the carbon compounds in coal to make a hydrogen-rich commercial gas.

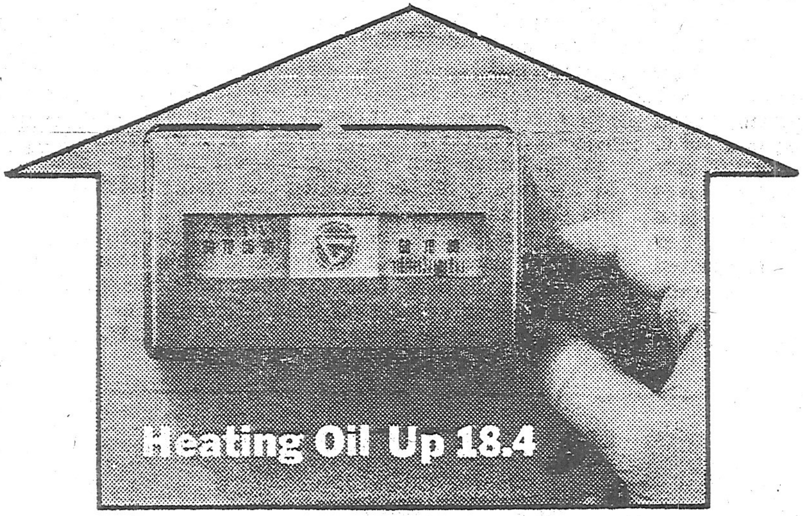
The United States also has more than 500 billion barrels of potential oil supply—equal to roughly 40 years of the present domestic demand—in the shale beds of the Green River area of Colorado, Utah and Wyoming. But there are enormous environmental problems to be overcome before the shale can be commercially mined.

# Power Hungry

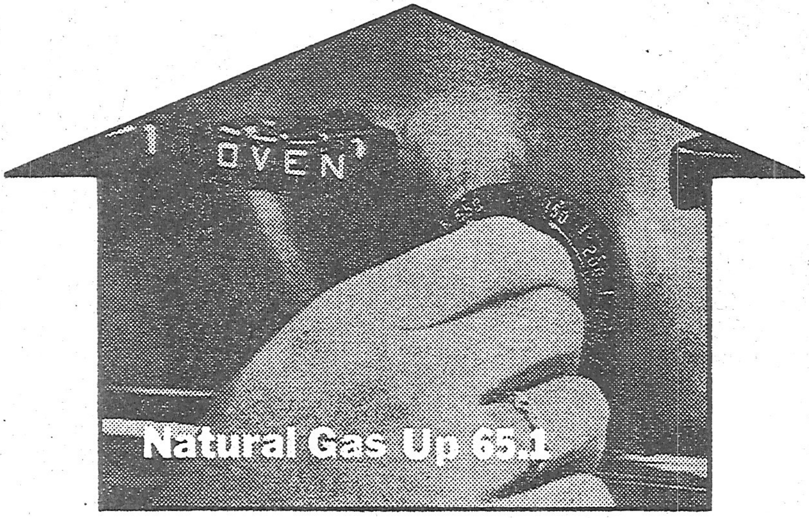
The difference a decade makes: Percentage increases in U.S. consumption of major energy sources between 1962 and 1972.



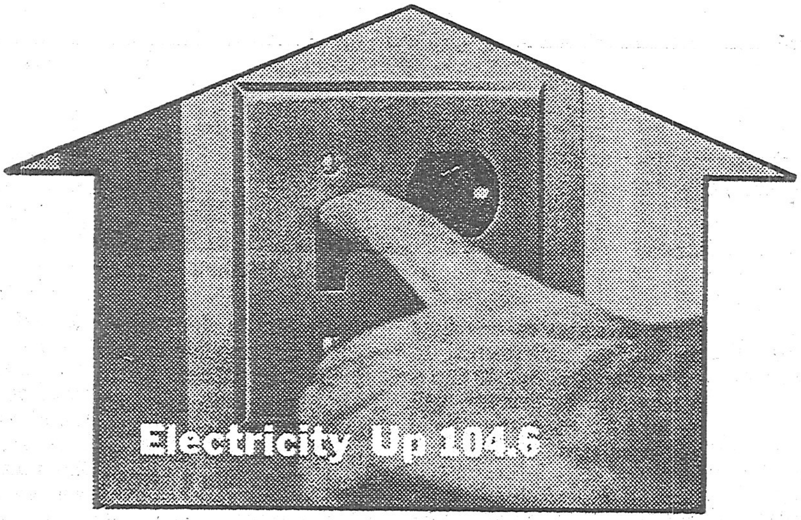
**Gasoline Up 49.7**



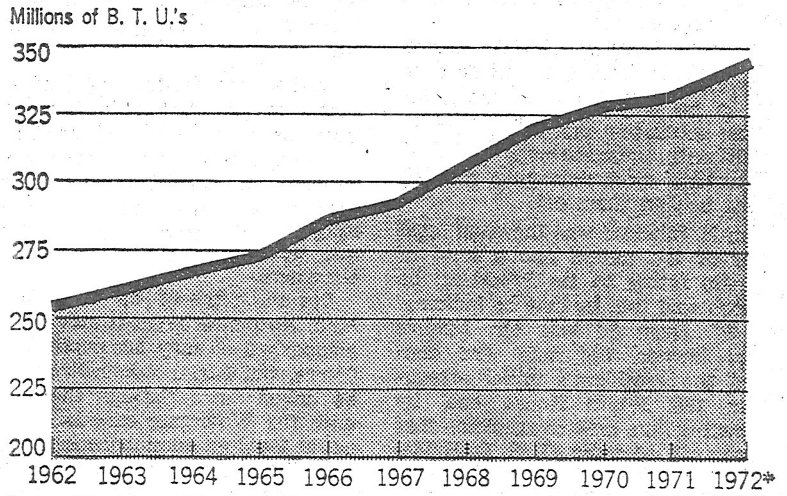
**Heating Oil Up 18.4**



**Natural Gas Up 65.1**



## Per Capita Energy Comsumption in the U.S.



*Source: Department of the Interior* *Preliminary